REVIEWS.

ART. XI.—*Yellow Fever, considered in its Historical, Pathological, Etiological, and Therapeutical Relations. Including a Sketch of the Disease as it has occurred in Philadelphia from* 1699 *to* 1854. *With an Examination of the Connections between it and the Fevers known under the same name in other parts of Temperate, as well as in Tropical Regions.* By R. La Roche, M. D., Member of the American Philosophical Society; of the American Medical Association; Fellow of the College of Physicians of Philadelphia; Corresponding Member of the Imperial Academy of Medicine, and Foreign Associate of the Medical Society of Emulation, of Paris; of the Academies of Sciences of Turin, Copenhagen, Stockholm, Nancy, and New Orleans; of the Medical Societies of Naples, Marseilles, Lyons, etc. Philadelphia: Blanchard & Lea, 1855. 8vo. 2 vols. pp. 1472.

To a large body of American physicians, the yellow fever continues to be a subject of deep and absorbing interest. Occurring, as it does, almost annually, or, at most, at comparatively short intervals, in numerous localities within the United States and upon its immediate borders; and being productive often of a mortality truly appalling, everything connected with its etiology, pathology and therapeutics must necessarily command the serious attention of the profession. Not merely of those physicians who reside within the localities to which the disease is ordinarily endemic, but of those, also, who, although residing beyond these localities, may be called upon to treat the disease, under certain contingencies, the occurrence of which, as is proved by the experience of the past, is by no means problematical.

Numerous treatises upon yellow fever are extant; many of them particularly valuable. We know of none, however, which can be received as a complete monograph of the disease, or as presenting even a good digest of all the facts known in relation to it, with the deductions to which these facts legitimately lead.

What we want is, not an account of the disease drawn up from the history of a single epidemic, or from its repeated occurrence in the same localities—a theory of its origin and pathological character derived from partial and limited observations; but a cautious examination into its causes, character, symptomatology, and treatment, based upon a full and candid analysis of all the well-authenticated facts, in reference to these several points, which have been collected during the various occurrences of the disease, in different portions of our own and other countries, as we find them recorded by those who have had the best opportunities for its investigation. A series of partial, or one-sided observations, may lead to conclusions the most inaccurate, in relation to the causes and character of yellow fever, which can be corrected only by a patient examination and comparison of all the observations to which we have access, bearing upon the particular points at issue.

The work of Dr. La Roche appears to us to present all that could reasonably be expected in a monograph on yellow fever, and to supply very fully a deficiency in our medical literature which has every year been more sensibly experienced.

With an extent of research, and a closeness of analysis seldom surpassed, the author has collected and collated and arranged all the materials presented by antecedent and contemporary authorities, so as to present a clear and accurate exposition of every point connected with the disease, as well in reference to its origin, its pathological characteristics and symptomatology as to the remedial measures that have been found best adapted to conduct it to a favourable termination. It is, unquestionably, the most complete and satisfactory monograph on yellow fever that has yet appeared, and will, we are persuaded, be received with no slight degree of favour by the entire medical profession.

There is scarcely a work, on the disease, of any value—scarcely a communication presenting a fact worthy of note, scattered through the medical periodicals of Europe and America, that has escaped the notice of Dr. La Roche. The originals have, with a very few exceptions, been consulted. The references made by the author, and the facts adduced by him, are, therefore, of unquestionable accuracy, being rarely derived from secondary sources. Hence, simply as a complete and faithful digest of the facts heretofore collected in relation to the yellow fever, the work of Dr. La Roche is one of no trifling value. But it is not merely as a digest, however reliable, of the accumulated observations of the profession on the disease of which it treats, that the treatise before us recommends itself to the notice of the profession; it has a much higher and more important character. It presents one of the fullest and most accurate delineations of yellow fever—its origin, invasion, semeiology, course, and terminations; the modifications it experiences from concurrent diseases; its diagnosis and prognosis; its pathological characteristics, prophylaxis and treatment—with which we are acquainted.

Every question connected with the disease is examined in detail, and so fully as to satisfy, so far as the present state of our knowledge is concerned, every rational inquiry in respect to it. On certain points, the author may, perhaps, be accused of dwelling to an unnecessary length; but when the importance of the subject in all its details, and the disposition that has recently been evinced to substitute, in reference to the etiology and pathology of yellow fever, hypothesis for facts, the necessity of the full and extended examination in which Dr. La Roche has entered, will be perceived.

On controverted points, including the entire question of the causes productive of the disease; its relationship to the other fevers endemic to the localities where it occurs, and its true pathological character, while the utmost candor is exhibited, the facts adduced by all parties being fully and fairly presented, the close analysis to which these facts are subjected by the author, and the strictly logical character of his deductions, give to the views he advocates a force almost irresistible.

Upon everything, in fact, connected with the subject of yellow fever, the work of Dr. La Roche will be at once received and long remain a standard authority.

The treatise commences with an excellent historical sketch of the epidemics of yellow fever which occurred in Philadelphia between the years 1699 and 1762, and a more detailed account of those of 1793 and '94; of 1797, '98, and '99; of 1802, 3, and 5, and of 1820, and 1853; prefaced by a description of the medical topography, climate, and population of the city at those different periods. In the ninety-seven pages devoted to these "preliminary observations," numerous prominent facts are developed having an important bearing on the general subject of the disease. This commences with the consideration of its medical history; and first, of its altitudinal and geographical ranges.

As a general rule, the disease may be regarded as one of low, flat, and level localities, and as appertaining more especially to hot latitudes. It never shows itself beyond a certain elevation, and, in this respect, is more restricted than ordinary paludal fevers.

> "The inability," remarks Dr. La Roche, "of the yellow fever to be generated at a high elevation above the level of the sea, depends in part on the greater elasticity and purity of the air, and diminution of atmospheric pressure, and on a more thorough ventilation. But the main cause is the absence there of the degree of atmospheric heat, which, as we have seen, is indispensably necessary for the elaboration of the morbific agent to which the disease is due. For the same reason, in part, though not exclusively, its geographical limits are restricted within certain bounds in a northern direction; while, in a southern, the same effects are produced, as it would seem, by an excess of heat and a variety of influences of a meteorological and telluric nature. Be the causes, however, what they may, on one point there can be no doubt—that the yellow fever has geographical limits, beyond which it does not appear—and that, within those very limits, there are many places where its usual apparent cause would seem to exist, but where, nevertheless, it has never shown itself, or has done so very seldom. The West India Islands, and part of the coast of South and North America, constitute its proper soil. From Brazil to Charleston in one direction, and from Barbadoes to Tampico in another, the causes of this form of fever are in constant, though unequal force, in regard to different seasons and localities. It prevails often, though not very generally, in some places somewhat more north than Charleston; visits, occasionally, the Atlantic cities of our Middle States, and has ascended as far as Boston; while, in the Mississippi Valley it has prevailed, as already seen, as high as Memphis, perhaps Gallipolis, or even higher. In an eastern direction, but within the same latitudes, it has extended to Cadiz, Xeres, Carthagena, Malaga, Alicant, Seville, Barcelona, and other cities of the coast and the interior of Spain. It has prevailed several times at Gibraltar, once at Rocheford, once at Lisbon, and once at Leghorn. Hence, we find it embracing a considerable portion of the earth's surface. In its fullest latitudinal extension, it reaches to between the twenty-second and twenty-third degrees south of the equator, and, on the other side, to the forty-second degree on the Atlantic coast, to the thirty-fifth degree on our Western waters, and to the 8.56° on the Pacific. Considered only in reference to its legitimate longitudinal boundaries, it stretches from about the sixtieth to the ninety-seventh degree of west longitude; while, if we take into account those points in Europe most distant from us, where it has occasionally appeared in an epidemic form, it will be found that its eastern limits may be traced to the second degree of longitude east of Greenwich. Its true area includes the Caribbean and other islands called the West Indies and Bahamas; the contiguous coast of Colombia and Guatimala and the extensive shores of the Mexican Gulf, sweeping from Cape Catoche on the west, to Cape Sable on the east, and running thence along the coast of America to Wilmington, N. C., Norfolk, Baltimore, Philadelphia, New York, Boston, and intermediate towns; in some of which places it is an occasional, not annual, or even frequent, visitor.
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> "Until recently, the river Amazon, which divides Brazil from Guiana, formed the boundary of the disease south of the equatorial line; for, although it is said to have prevailed at Olinda from 1687 to 1694, and to have shown itself as far as Montevideo, in the beginning of the present century, the latter circumstance is open to some doubt; while in Brazil, from the close of the 17th century to the middle of the present, the disease was not observed. Since 1850, it has invaded Rio Janeiro, Bahia, Pernambuco, and other places of that country. It is, in greater measure, a stranger to the Pacific, having prevailed but once at Panama, twice at Guayaquil, and once at Callao. It does not appear

in the East Indies; the fever described by Wade, Fontane, Lind (of Windsor), Johnson, Twining, and other writers, appertaining to the class of common bilious remittents. It has never prevailed in China, Singapore, Siam, Ceylon; it has prevailed only occasionally on the African coast, Senegal, and the Gold Coast, and has but three times, in the space of eighty-six years, showed itself in Cayenne.

"Within those limits, it has in some one or more places originated and prevailed to a greater or less extent, occasionally or frequently, either as an endemic or as a mild or wide spreading epidemic. Beyond these it never shows itself; and though—whether north or south, east or west—it does not reach the point at which common malarial fevers stop; it approximates to these diseases, so far, especially, as its northern or western extension is concerned, it being circumscribed within certain bounds; for they, too, have their limits. The effect, in both instances, is due to modifications in the same morbific agencies."

While the yellow fever does not vary, either in regard to its pathology or its pathognomonic phenomena, in whatever region or at whatever period in the same place it may show itself, whether sporadically or in an epidemic form, it, nevertheless, like many other diseases, assumes, in different places, and at different periods, and often in the same place and during the same season, diversified aspects or characteristics, proceeding, not from any specific difference of nature, but from various degrees of reaction; from a tendency to depression in the vital force; from the predominance of certain symptoms, appertaining or not to the disease, and varying according to the greater or fewer number of the vital organs involved in the derangement of the body, or from other causes; the whole depending in peculiarities of constitution, temperament, habits, or conditions of health of those attacked; in a difference of intensity in the morbific agent, and on numerous contingencies resulting from the nature of the locality, and the degree of temperature, humidity, and other phenomena in the surrounding elements.

In his description of yellow fever, Dr. La Roche, after presenting an account of the symptoms by which the disease is characterized, in the progressive order in which they present themselves—attention being paid to the stages into which the attack is divided; that of reaction, that of calm or remission, and that of exhaustion—indicates the several leading types under which the disease may occur, namely: first, the inflammatory, which he describes under three different grades; the intense, the mild, and the ephemeral; second, the congestive form, having four grades, the aggravated, the adynamic, the walking, and the apoplectic.

The symptomatology of the yellow fever, as delineated by Dr. La Roche, is marked by extreme accuracy, precision, and clearness. Studied in connection with the very full examination into which the author enters of each of the characteristic phenomena of the disease—its premonitions and mode of invasion; the disturbances in the circulatory system by which it is attended; the condition of the skin and of the digestive organs; the state of the tongue and respiration; the character and location of the pain so generally present; the characteristics of the countenance; the state of the urine, and of the muscular and nervous systems; as correct an idea of yellow fever will be acquired as it is possible to derive simply from any mere description, however minute and faithful, unassisted by clinical experience.

In regard to the state of the blood in yellow fever, a question upon which some discrepancy of opinion exists, Dr. La Roche, after a very full survey of the facts recorded by different medical observers, as well as from a careful collation of these with the facts that have fallen under his own notice, arrives at the following conclusions:—

"1. In some instances, the blood appears at first unaltered as regards colour, proportion, firmness of the crassamentum, power of coagulation, quality of the serum, &c. and continues so, till the accession of the second stage.

"2. More generally, and even in cases in which, judging from its general aspect, it would seem to preserve its usual characters, the blood is found more or less—often very considerably and as often completely—deprived of its power of coagulation; the crassamentum, when the separation takes place, being generally found broad, flat, thin, of soft consistence, and diffluent.

"3. But this inability or reluctance to coagulation, though generally exhibited, is not universal, and cases occur in which the blood coagulates with as much readiness and firmness as in other diseases.

"4. In many cases, the power of coagulation, though not lost, is tardy in manifesting itself; often it does not do so until the blood has been for some time removed from the body and exposed to the action of the atmospheric air.

"5. In many instances the blood, from the onset of the attack, though, more generally, after the accession of the later stages, not only manifests a reluctance to coagulate, but remains fluid, and, as it were, dissolved.

"6. In some cases, during most epidemics, and very generally during others, the blood is found sizy, and even cupped, and presenting, more or less exactly, the appearance described by Dr. Rush.

"7. More frequently the blood does not present a buffy character, and is neither sizy nor cupped.

"8. In some instances—during some epidemics and seasons, very generally —the blood, at the onset of the disease, is of a florid, brilliant red or scarlet colour. This appearance is more common when the circulation is more than usually rapid.

"9. In all cases, whatever be the appearance of the blood at the onset of the attack, it becomes dark, and even black as the disease advances and passes to the last stage. In many instances, and during some epidemics, in the large majority of cases, it assumes a dark hue throughout the whole course of the disease; and in all instances it is found so after death.

"10. In some instances, according to Warren, Hillary, Moultrie, Stevens, and Caisergues, the crassamentum presents dark blackish spots on its surface.

"11. It is not unfrequent when the blood is dark, while issuing from the body, to find it becoming more florid as it flows, or after exposure to the air.

"12. In some instances, the blood presents a mixed appearance, as if the vein had contained two differently coloured fluids—the one bright red, the other almost black.

"13. In some instances, the blood has been found, even at the onset, quite fluid and of thin consistence.

"14. In other cases, it is represented as thicker, in the early and after stages, than in health, and as having the appearance of molasses. The same character of the blood is noticed after death.

"15. In some instances, there is uncommon reluctance in the flow of blood, although the pulse may feel strong and full.

"16. As regards the arterial blood, Dr. Hacket (*Med.-Chir. Rev.*, xvi. 291) found it, in the living subject, to present its characteristic bright scarlet hue. But that such has not always been the case, is fully proved by the statements of older and modern writers. Towne observed that not only the venous, but the arterial blood also, was dark, and became 'a lazy, stagnating, and inactive puddle.' Dr. Stone found it black, at Woodville, in 1844, and at Natchez, four years after. Pariset affirms that the arterial blood presented the same characters as the venous, in regard to colour and consistence, in Barcelona, in 1821. We have also seen that similar observations were made by Dr. Stevens, of Santa Cruz; and every dissection, those of Dr. Hacket not excepted, shows that, after death, the blood found in the left cavities of the heart differs in nothing from that contained in the right.

"17. The increased heat of the blood beyond the healthy standard, in the early stage of some forms of yellow fever, is placed beyond a possibility of doubt, and cannot be matter of astonishment. It is, of course, not peculiar to the disease, and is generally, though not always, found in other fevers and the phlegmasia.

"18. It has been seen that, while changes are effected in the character and appearance of the blood generally, and in the consistence and colour of the crassamentum, alterations of equal importance and extent are noticed in the serum, both in respect to quantity and coloration.

"*a*. In many instances, the number varying at different seasons, there is no separation into crassamentum and serum, the blood drawn retaining its homogeneity, and this, whether it coagulates or remains fluid.

"*b*. In many cases, when the separation into crassamentum and serum takes place, the quantity of the latter is much smaller than in the normal state, especially in the early stage of the disease.

"*c*. On the other hand, Drysdale remarks that in some cases the quantity of serum was in excess. Dr. Imray, too, states that, at Antigua, in 1838, the serum was in larger quantity than natural, even at the onset of the attack; so, likewise, Gillespie and Moultrie.

"*d*. Like Dr. Rush, Dr. Drysdale states that in some cases the serum had the appearance of water in which meat had been washed. Dr. Caisergues makes similar remarks as to the blood issuing from the outlets of the body.

"*e*. The serum is usually found of a yellow or an orange colour.

"*f*. In some instances, a portion of the red or black extraneous matter is precipitated to the bottom of the cup, or the serum mixes intimately with these, and acquires thereby a bright scarlet, or dark or muddy hue, as the case may be.

"19. It remains to remark, in reference to the state of the blood in yellow fever, that it has been found to emit a peculiar smell, which differs from that emitted by the blood in other fevers—plague, typhus, typhoid, &c.—and is probably produced by a volatile salt of ammonia.

"The foregoing facts and statements," says Dr. La Roche, "can leave no doubt in our minds that the blood in the yellow fever approximates, to a great extent, to the condition it presents in other pyrexia of the zymotic class. It exists, in varying degrees, in all malarial diseases, from the simple intermittent to the malignant remittent, as well as in typhoid, typhus, and relapsing fever, to say nothing of cholera, the plague, and eruptive fevers."

The hemorrhages which occupy so conspicuous a place in the list of the symptoms of yellow fever, are treated of at some length by Dr. La Roche. Though not peculiar to the disease, they constitute one of its main characteristics. They occur in many mild or moderate cases; are absent in but few of the violent, malignant, and fatal ones; and issue from a greater variety of parts than is the case in most other complaints. They may proceed from the skin, the lining membrane of the nose, the gums, tongue, mouth, fauces, conjunctivæ, ears, œsophagus, stomach, large intestines, or bladder.

The tendency to hemorrhage in yellow fever is not equally conspicuous in all places and at all times. In one epidemic, also, a certain form of hemorrhage will be often encountered, which, at another season, seldom shows itself, while others are predominant. At one period, some hemorrhages tend to a favourable issue, which at other times fail more or less completely in this respect, and point to an opposite result.

Besides these external hemorrhages, blood is often extravasated in the substance of the tissues or organs, producing petechial spots, ecchymoses, and intermuscular or cellular collections.

The facts in elucidation of the foregoing positions, Dr. La Roche has collected and arranged with much clearness.

The source of the jaundiced hue of the skin in yellow fever, and its relative value and import as a symptom of the disease, are questions of no trifling interest, and, as such, are examined at considerable length by Dr. La Roche.

"Natural, however," he remarks, "as it might be to infer, from the very general adoption of the name of yellow fever, that the symptom in question is a constant attendant on the disease, experience has amply shown that such is far from being the fact, and that, in a large number of instances, the case proceeds to a favourable or fatal issue without being characterized by the phenomena in question."

"Nothing, as has long since and repeatedly been pointed out, in this country and elsewhere, is more evident than the impropriety of the name of yellow fever, inasmuch as the peculiar discoloration from which that name is derived is not pathognomonic of the disease; for not only is it, as already said, absent in very many cases throughout the whole course of the attack, but, as we shall see, it often does not show itself until after the death of the patient, or at a period when the true character of the disease has already been fully made out; while, again, yellowness of the skin is an attendant on other complaints having little, if any, pathological and etiological connection with the yellow fever."

"As regards the proportionate number of cases in which the jaundice occurs, we possess but few data upon which to form a positive conclusion. From all that we can gather on the subject, we may infer that the number varies in different places during the same or different seasons, being limited in some, and considerable in others; that the same difference is found to occur in the same place during different seasons; and, moreover, that the proportion varies according to the issue of the disease and the rapidity of the attack."

"To this it may be added that the frequency of jaundice varies at different periods of the same epidemic. In some seasons, it is more common at an early period, and gradually becomes less so as time advances; in others, the reverse is the case. The early cases rarely present the icteric coloration, at least during life: while later the skin becomes yellow in almost every instance." "As a general rule, jaundice may be stated to present itself much less frequently in those who recover than in those who die." "Its occurrence also varies in point of frequency according to the rapidity of the cases, whether these terminate in recovery or death. In this country, when the disease is cut short, by art or the efforts of nature, in a short time, or when it carries off the patient before the third day, yellowness is of rare occurrence. Statements of the same kind are found, so far as concerns the West Indies, in the writings of Dr. R. Jackson and others."

"After what has been said of the frequent absence of jaundice in cases that recover, we must naturally be prepared to find it more frequently in the malignant form than in mild cases of the disease, death being more usually the result of the former. Such, however, is the case, whether they terminate favourably or fatally."

"Some difference exists, in various places or seasons, as also in various cases during the course of the same epidemic, in regard to the particular hue of the skin—the shades varying from a pale straw or muddy to a dark-reddish, or brown mahogany, or copperish colour, embracing between the two extremes the different modifications of yellow, orange, or saffron, light and deep. It is generally of a uniform, but sometimes of a mixed and variegated character. These various shades of colour do not appertain individually to any special region, but have each been found to occur, under particular circumstances, in all parts where the fever has prevailed—sometimes at different seasons, at others during the same season. Such has been the case in this city, where, however, the deep tints mentioned seem to have more generally been observed."

Some difference of opinion appears to exist as to the degree of importance to be attached to the jaundiced coloration of the skin in yellow fever, in forming an estimate of the probable issue of the case. In reference to this point, Dr. La Roche examines the symptom relatively to the time of its appearance, the shade it assumes, as well as to the degree, extent, and rapidity of its diffusion.

While by a few writers a general yellow suffusion of the surface is considered of little importance in yellow fever, by the larger number of authorities it is maintained—and the experience obtained in this city, as elsewhere on this continent, may be adduced in their support—that the early appearance of jaundice is indicative of danger, and that this danger increases in proportion to the earliness of its accession.

> "That," remarks Dr. La Roche, "the appearance of jaundice must generally be viewed as a sign of serious import, especially when manifesting itself early, no one can deny. Under most circumstances, it seems to show that the cause has made a strong impression on the system, marking, as Dr. Musgrave says, the intensity of the disease and its degree of danger. But every physician who has seen the yellow fever must have noted not a few cases, even of a serious character, and when the jaundice has appeared early, or attained considerable intensity, which nevertheless have terminated favourably. Examples of this kind are mentioned or referred to by competent authorities on the subject. We know, also, that in the mild forms of the disease, which often, if not generally, end in recovery, jaundice is not unfrequently an attendant symptom." "So far as regards the early and middle periods of the disease, every physician—with few exceptions, perhaps—agrees in regarding jaundice, when it appears after the sixth, but more particularly the seventh or eighth day, as of little import, or even as a favourable or critical sign."

In regard to the connection between certain shades of discoloration of the skin and the several varieties in the form and the degree of malignancy of the disease, Dr. La Roche lays it down as an established general rule that, all things being otherwise equal, the severity and danger of the attack is proportioned to the deepness and general diffusion of the discoloration; at the same time, cases not unfrequently occur—in some epidemics very generally—in which the light lemon-colour of the skin is an index of greater danger than a dark yellow.

Nor do the period at which the jaundice appears, and the particular hue it assumes, alone furnish us with indications as to the issue of the disease. Considerable importance is due to the degree of rapidity with which it spreads and increases in intensity. The danger of this rapidity in the diffusion of jaundice has been at all times noticed; while the comparative innocuousness of the discoloration, and even the benefit resulting from it when it occurs gradually, have not been overlooked.

On the subject of the cause of the discoloration of the skin, much difference of opinion has and still continues to exist among physicians conversant with the disease. By one party it is ascribed to a redundancy of bile, and the regurgitation and absorption of a part of it, either before or after its discharge from the liver, owing to some obstruction to its passage into the duodenum, from spasm of the duct or other parts; gall-stones, or simple inflammation, and consequent thickening of the mucous membrane; from severe contraction due to violent vomiting and straining, forcing the fluid into the vena cava; or, as is more recently believed, to the retention in the blood of the constituent principles of the bile, arising from a deficiency of hepatic secretion and elimination.

By others it is maintained that the discoloration is the result, in part at least, of the yellowness of the serum, arising from a colliquation or dissolution of the red globules, its separation from these, and admixture with their colouring matter and subsequent effusion under the cuticle; or, in great measure, of an *error loci* of the diseased globules in the white vessels, or the cellular tissue, as in ecchymosis; in other words, of the existence of a congestive state of the subcuticular capillary network, akin to that occurring in the mucous membrane, and giving rise to hemorrhage.

The doctrine of the strictly bilious origin of the jaundice in yellow fever is founded—

"1. On the analogy and supposed identity of the yellow with other fevers in which jaundice is undeniably due to bilious admixture, from absorption or other causes. 2. On the diffusion of the yellowness. 3. On its peculiar hue, and the close analogy between the latter and the discoloration in ordinary jaundice, in which the effect is due to such absorption (in the event of the existence of obstruction), or to the retention in the blood of the constituents of the bile. 4. On the concomitant deficiency of the bile in the primæ viæ, and the presence of the fluid, or of its colouring matter, in the products of the emunctories—more especially in the urine, judging from the colour of that fluid, and its becoming greenish on the addition of an acid. 5. On the ordinary association existing between its presence and the act of vomiting, which often brings on a jaundiced condition of the skin. 6. On the occurrence of the same discoloration, from an analogous cause, in cases of disease arising from the action of animal viruses or mineral and vegetable poisons. 7. On the rapidity with which it often disappears during convalescence. 8. On the impossibility of referring the lemon or deep orange hue, which the surface often assumes, to any other cause. 9. On the frequent existence of inflammation of the gall-bladder, biliary ducts, and duodenum, as revealed on dissection, a condition of parts which often gives rise to jaundice, and can only produce the effect by obstructing the passage of bile. 10. On the peculiar condition of the liver, which puts an impediment to the secretory functions of that organ, and, preventing the elimination, through its agency, of the constituent materials of the bile, causes it to be thrown on the tissues. 11. On the fact of the pre-existing discoloration of the serum of the blood, which discoloration arises from the presence of the constituents of bile.

"Such a discoloration, says a recent writer (Levacher), must not be ascribed to the yellow transition of the general ecchymosis, for it takes place at the same time with the latter, and does not succeed it; while, again, it does not occur in other diseases in which ecchymosis presents itself—as in cholera. If the yellowness were the effect of ecchymosis, the skin should first be dark; then it should become yellow, as the ecchymosis disappears. It must depend on some other cause; it exists alone sometimes, and is complicated with effusion of dark-coloured blood, for the production of the bronze and blackish yellow alluded to. Finally, the colour disappears in milder cases, when the skin is of a pale saffron hue, without passing through those gradations observed on the surface during the clearing of sanguineous transudations and ecchymosic extravasations."

Those who refer the discoloration of the skin in yellow fever to a sanguineous origin, support their view by the following arguments:—

"1. The discoloration does not always appear first in the eyes, as is the case in jaundice, but shows itself as frequently, if not more so, in other parts—the face, neck, &c.—and in its progress usually follows the course of large vessels.

"2. It is often partial or in streaks—much darker in some spots than in others. It is a subject of common observation that the bronze or mahogany hue disappears when pressure is made with the finger, but slowly returns when the pressure is removed—a result which does not obtain in bilious jaundice.

"3. The discoloration of the skin in yellow fever sometimes, nay, often, does not make its appearance till after death, when all redness in the capillaries has subsided, and the skin is in a condition similar to that in which it is placed when death takes place, after a part has been severely contused. This appearance of jaundice after death, and its instantaneous development to such a degree as to impart a yellow tinge to all parts of the system, are incompatible with the idea of reabsorption, for the power by which this process is executed must be lost with the death of the parts concerned. With the extinction of life there is a cessation of all organic functions.

"4. The rapidity with which this discoloration is diffused over the body, and with which it assumes a dark, often the darkest hue, is incompatible with the idea of its originating from the common cause of jaundice, which, whether arising from ordinary morbid conditions of the liver or annexed organs, or connected with bilious remittent fever, is of slower progress in both these respects.

"5. The biliary organs never, or very rarely, participate in a marked degree in the symptoms of yellow fever, which progresses, from first to last, without any increase in the quantity or alteration in the quality of the biliary secretion; and though jaundice is generally associated with a deficiency of bile, in many cases of the disease attended with that symptom, the secretion is not invariably deficient in quantity, while the fluid, when secreted, remains generally of natural quantity.

"6. The colour of the surface in the yellow fever does not closely resemble that observed in jaundice or remittent bilious fever; or at least does so in exceptional cases only. The dingy or pale muddy-yellowish tint so common in the former, is found in neither of the others, nor indeed in any disease attended with yellowness due to bilious derangement; while, in many instances, the colour approximates much more to that observed in a contused part, when the blood extravasated under the cuticle is being removed through the process of absorption. The dark brown, yellowish-red, the bronzed or mahogany hue of the skin; the violet or black tint; the marbled or clay-coloured appearance; the dingy gray and dirty olive, are all far removed from any colour resulting from effusion of bile, or of the bilious colouring principle, and noticed in any form of jaundice, but are all readily explained on the supposition of an altered condition of the blood or bloodvessels of the parts—of a change produced by the extravasation or tardy circulation of serum of deep yellow colour, tinged with dissolved red or dark colouring matter, while the dark spots or blotches, discovered in different parts, are evidently and admissibly due to a sanguineous extravasation.

"7. Sometimes, as remarked by Dr. Blair, ecchymosis of the eye, and yellowness of a circumscribed character, co-exist and extend *pari passu*, the yellowness keeping one-eighth of an inch in advance of the ecchymosis. After the absorption of blood in convalescence, a deep orange colour is left in the bloodspots. It may be added, that stains of an ochre colour in the brain and kidneys, in instances in which it may be inferred blood had been extravasated, were found, on chemical analysis by Dr. Davy, to depend on the presence of peroxide of iron.

"8. In jaundice, the urine is coloured by bile. Such is not the case in yellow fever, even at the time that the skin is highly discoloured. Cases doubtless occur in which the urine is found tinged, but these cases are rare, and are found connected with bilious jaundice, which, sometimes, though not necessarily, supervenes in the course of the disease.

"9. The jaundice of the yellow fever is connected with a deranged condition of the blood—imperfect power of coagulation, or a complete destruction of that power, with a yellow or even orange colour of the serum, mixed, in many cases, with a portion of red or dark colouring matter. This is associated with a relaxed condition of the extreme vessels, as evinced by the disposition to, and frequent occurrence of hemorrhage from the mucous membranes and the skin itself. When, with these circumstances in view, we observe the peculiar coloration of the skin in yellow fever—a coloration inexplicable on the supposition of a bilious agency—we may readily attribute it to the cause in question.

"10. The yellowness, which, as we have seen, first occurs in the eyes or face, succeeds to a red turgescence of the skin; as this turgescence, which is generally great, subsides, the dusky tinge is perceived gradually spreading, and becoming dark in proportion as the tone of the vessels diminishes and the alteration of the blood increases. The redness coincides with the existence of the florid appearance of the blood and activity of circulation, and the yellowness with the dark colour of the fluid and lentor of the circulation.

"11. The effect of animal venoms, as well as of vegetable and mineral poisons, in inducing a discoloration of the skin not unlike that of yellow fever, may be adduced in further illustration of a sanguineous origin of the latter, for the action of such poisons, in instances of the kind, is evidently exercised upon the blood, and the yellowness thereby produced is the effect of changes therein occurring, and not the result of a bilious admixture.

"12. Yellowness of the skin, not very unlike that which occurs in some forms or stages of yellow fever, is an attendant on diseases in which the biliary organs and secretions are not necessarily or often implicated, but in which the blood is invariably morbidly affected—chlorosis, typhus, relapsing fever, &c.

"13. The jaundice of yellow fever, whenever formed, subsides much in the same way as the discoloration admitted to be produced by subcutaneous sanguineous effusion, and this subsidence is not promoted by those means which are found beneficial in jaundice from bilious suffusion.

"14. Few physicians, at all experienced in the yellow fever, will refuse to admit that the dark ecchymosic appearance of the skin is due to the presence of blood under the cuticle. If such be the case, we can see no reason to deny a like origin to the mahogany and bronze appearance of the surface, gradually down to the dark, dusky, and finally dull, pale yellow hue which it assumes, all of which are known to be producible by such a cause, and not to arise from bilious suffusion; particularly when we bear in mind that the ecchymosic appearance never exists alone, but is always combined with a jaundiced discoloration of the skin.

"15. Jaundiced suffusion, in diseases in which it is the effect of bilious absorption, or of the retention and accumulation of the elemental constituents of the bile in the blood; and the want of their elimination therefrom, whether those diseases be of a febrile character or otherwise, is in itself a harmless symptom. In the yellow fever, on the contrary, it is, as we have seen, except under particular circumstances, and when it shows itself at an advanced stage of the attack, the harbinger of formidable danger, and, at an early period, the almost certain sign of a fatal issue."

Dr. La Roche, while he admits that the doctrine of the sanguineous origin and nature of the yellow discoloration of the eyes and skin in the yellow fever possesses great advantages over the opinion which would ascribe the discoloration in question to a bilious suffusion, or to any particular condition of the hepatic functions, doubts whether we can adopt it in all cases to the exclusion of the other.

He believes that those instances in which the skin is of a uniform saffron or lemon colour, and especially those in which the suffusion assumes the character of a critical change, or takes place at any very late period of the disease, when the powers of the system are already recruiting, or during convalescence, may, without risk, be referred to a bilious origin. The discovery of the constituents of the bile in the urine, in cases of yellow fever attended with jaundice, lends additional support to the opinion. Still more to the purpose are the facts adduced, in which the perspiration imparts a yellow or saffron colour to the substances impregnated with it. We have seen also that the presence of the constituents of the bile is discovered in the blood of yellow fever. It is found in the serum obtained from under the cuticle in blistered surfaces, as Dr. La Roche has himself observed, on several occasions, in the presence of some medical friends. The same is found in the yellow fluid of vesicles occurring in the course of the disease. Bile is also found in the serum of blood drawn from the veins or arteries, in the pellicle formed over the crassamentum, as well as in the fluid taken from the heart or large vessels after death.

"The analogy," remarks Dr. La Roche, "in this respect, between the yellow fever and ordinary jaundice is striking; and if, in the production of the latter, the bile is admitted to play an important part, it is difficult to refuse our assent to the opinion which ascribes as important an agency to the same substance in the causation of the yellow discoloration of yellow fever. There is no absorption or regurgitation of bile already formed, for, in by far the largest number of cases, none is secreted. There is merely retention in the blood of those elementary or constituent parts of that fluid which ought to have been eliminated from the system, but of which, from its peculiar morbid condition, the liver has not been able to rid the system. This view reconciles, to a certain

> extent, both doctrines; for though the jaundice is doubtless due not to bile, properly so called, but is a peculiar condition of the blood, the latter owes the power of discoloring the tissues to biliary elements; and if that discoloration differs in some respects from that of ordinary jaundice, the difference, in all probability, depends, as long ago surmised by Warren, on the attenuated, dark, and diseased condition of the blood, and on the sluggish manner in which it circulates in the capillaries. Indeed, there can be no doubt that the bronze and mahogany hue, the mottled and other unusual appearance of the skin described in the preceding pages, are due to a sanguine exhalation, or to a mixture of tints—of the yellowness arising from the jaundice proper, on the one hand, and, on the other, from the dark or violet red of the skin produced by the altered and almost stagnated blood contained in the capillaries of the skin. The correctness of this opinion is shown by the fact that, if a part so coloured is pressed with the finger, the bronzed or mahogany hue disappears, more or less completely, but the yellow colour remains unchanged, and as the blood returns in the capillaries, the dark colour in question returns with it, and the skin resumes the peculiar appearance it had before."

It will be impossible for us to follow Dr. La Roche in his very minute and extended examination of the nature and source of the black vomit in yellow fever. In two former numbers of this journal the subject is treated of by him in a paper which forms the basis of the chapters devoted to it in the chapters before us. From that paper our readers have been enabled to judge of the author's manner of discussing the pathology of this very common and serious symptom of the latter stage of the more severe forms of yellow fever, but one by no means confined to that disease, much less pathognomonic, as it has been regarded by some, and of forming a correct idea of the views advocated by him in relation to its character.

With the most accurate and authoritative of the more recent observers, Dr. La Roche refers the matter of black vomit to an effusion of blood from the capillaries of the inner surface of the stomach; the blood being altered by the action upon it of an acid, the morbid product of the diseased stomach. The difference it presents in its physical appearance depending on the manner in which the blood is effused into the stomach—whether drop by drop, or in a stream—and on the degree of acidity of the gastric secretion, or the quantity of serous fluid it meets with in that organ.

The facts connected with the pathological anatomy of yellow fever have been carefully collected and compared by our author. From these we learn that the cerebro-spinal organs, the brain and spinal cord—and the ganglionic system, are often free from any appreciable lesions; while the morbid changes occasionally discovered in these parts are not to be considered as peculiar to, or characteristic of yellow fever.

The same remarks may be repeated in relation to the respiratory organs. Neither does the heart present invariably any pathological changes which can be set down as peculiar to the disease.

> "Of all the organs of the body," remarks Dr. La Roche, "the stomach may justly be regarded as the one most generally and seriously implicated in the yellow fever, and in which the marks of disease are most frequently discovered after death. Externally, it is sometimes found of a yellow colour, but in other cases—and, indeed, generally—it retains its normal appearance. On opening the organ, it is almost uniformly found to contain a greater or lesser quantity of matter similar to that thrown up during the latter stage of the disease, and known under the name of black vomit. In some cases, the contents of the stomach consist of blood more or less pure, with or without coagula, and generally combined with a portion of glairy matter, and substances swallowed a short time before death. In some instances, the mucous coat is smeared over with a dark, adhesive, jelly-like substance, containing portions of blood. Under this

substance, and sometimes when it does not exist, we find a layer of grayish matter, not unlike a mixture of linseed meal. In some cases, again, the lining membrane, when cleansed from these various coatings, is found to present its normal appearance, and to be perfectly free from any appreciable morbid lesion. Indeed, in not a few instances, it is even whiter than in the normal state.

"The integrity of the mucous membrane in such cases—the absence of capillary congestion or inflammation—has been ascribed to the effusion of the matter of black vomit or of blood, a quantity of which is nearly always found in the viscus. But this opinion, which would seem to receive support from the known origin of that matter, and from the fact that the quantity is often less in cases where the membrane is found most diseased, is supposed to be negatived by the fact that, in some cases, the quantity is just as large when the membrane is diseased as when healthy, and that in some, in which the stomach was filled with black fluid, the vessels of the mucous membrane were found literally gorged with blood. Such instances, however, are, after all, seldom encountered, and the simultaneous existence of capillary congestion in the mucous membrane, and sanguineous effusion in the cavity of the stomach, is no proof that the latter does not usually relieve the former, but merely shows that, in cases in which it occurs, the hemorrhagic tendency has been so strong that the blood effused from the engorged capillaries has been rapidly replaced.

"The number of cases in which the membrane is exempt from appreciable morbid change is generally limited, and varies in different places and seasons. They are encountered more particularly in malignant cases in which arterial reaction is but feeble, or in rapid cases of other varieties.

"Much more frequently, the mucous membrane is found more or less diseased, and presenting changes, which, though regarded by some as the product, in most, if not all, cases of capillary congestion, of mere staining, or, indeed, of any other morbid process than inflammation, are admitted by a large number of pathologists as indicating—not all, but some—the prior existence of the latter diseased condition. Hence, by most writers on the yellow fever, the stomach is stated, in positive terms, to present after death decided marks of inflammation; or alterations are described which are known to be the effects of that process.

"That some of these changes are of a nature to justify the opinion of those who deny the truly inflammatory character of the local disease in all cases, there can be no doubt. Nor is it improbable that many of those who have assumed that the changes found are due exclusively to inflammation, have predicated that opinion on appearances which more ample experience would have shown to be the result of a different morbid process. But it is not less true that, in a large number of individuals who have died of yellow fever, the lining membrane of the stomach bears the most unequivocal marks of inflammation. On both these points, the following enumeration of the morbid changes found in that organ will leave no doubt:—

"A. In some cases, the stomach is found contracted; in others, it is distended.

"B. The longitudinal rugæ are enlarged. The surface has often a vermicular appearance, being corrugated and thrown into numerous folds.

"C. The capillary vessels are, to a greater or less extent, injected with blood. Sometimes these vessels are literally gorged; to such degree, indeed, that portions of the membrane, 'cut and dried, have formed very perfect preparations, exhibiting the ramifications of the vessels into their minutest divisions in a very beautiful manner.' (*S. Jackson*, p. 21.)

"D. The redness is, in some cases, of a very intense and dark hue, and has been compared to the redness produced in that organ by the ingestion of acrid poisons. In other instances, the colour is lighter, assuming a rose, claret-brown, ruddy, pale ash, greenish, or yellowish hue. In other instances, again, the colour is leaden, livid, or even nearly black.

"E. This discoloration is either uniform in appearance or in the form of arborizations; extending over a large portion or the whole of the membrane, or, as oftener takes place, it is limited to the cardiac or pyloric orifices, and to the larger curvature, and presents itself in patches of greater or less size, and more or less numerous. In addition, whatever may be the tint of the membrane, we discover streaks or spots of a purple colour, spreading in various directions over both the altered and healthy parts. These spots assume frequently the appearance and characteristics of true ecchymosis—varying in size and number. At other times, with or without those large patches, are found numerous small, dark red, or violet round spots superadded to the rose hue of the surface, with which they form a distinct contrast. They resemble flea bites, and have the same appearance as the petechial spots noticed on the external surface of the body.

"F. The membrane is the seat, besides, of abrasions, or small depressions, or pits, like holes or furrows, which convey the idea of a portion of the tissue having been removed.

"G. It very frequently is found mammillated, even to a remarkable degree. Louis found it so in two-thirds of his cases.

"H. The membrane in such cases, or even when no mammillated elevations exist, is found more or less considerably thickened or opaque.

"I. In some of the latter cases, or even when not thickened, the membrane is softened, and easily detached, especially about the great *cul-de-sac*. In a few cases, it is the seat of ulceration, or of gangrenous changes.

"K. In some instances, more particularly when the disease was of a malignant or congestive character, an effusion is discovered under the tissue in question."

The appearances detected in the œsophagus and small intestines do not differ materially from those exhibited in the stomach. They are generally, however, less marked, and perhaps more frequently absent; in the small intestines than in the stomach.

A change in the appearance of the liver, in subjects who had died of yellow fever, has been noticed from an early period. It is described as being of a light yellow, nankeen, fresh butter, coffee and milk, gum yellow, buff, gamboge, light orange, or pistachio colour. Louis, from the constant occurrence of this appearance of the liver in the cases examined by him during the epidemic of Gibraltar in 1828, was led to regard it as peculiar to the yellow fever. The more recent dissections made in this city and country have fully confirmed the statements of Louis and others as to the very frequent occurrence of this discoloration. In some cases, it occupies the whole surface and pervades the entire parenchyma of the organ; while in others, it extends only partially over both, giving to the organ a marbled appearance—presenting throughout patches or regular stratæ, and alternating with others of a dark green colour. It is limited occasionally to a single lobe, usually the left. The pale yellow liver is more common and marked in women and children; in the latter assuming, after a short maceration, the paleness of box-wood. It differs, as regards frequency, in different seasons, and even at different periods of the same season.

"Frequently, however," Dr. La Roche observes, "as this peculiar coloration of the liver has been observed, it is far from being universally so; cases occurring in which the organ is found of a different hue—dark yellow, brown, red, purple, bluish, slate, chocolate, or livid. It has been described as of brick colour, and compared to rhubarb or to Peruvian bark. (*Arejula.*) In other cases, again, it retains its natural appearance externally and internally, and is otherwise healthy. The parenchyma, when divided, is often found hard, dry, tough, and sometimes dry and brittle, and more or less devoid of blood; while, in some cases, the viscus is more or less gorged with blood, and softer in texture than natural. In some cases, the biliary pores contain bile, but more frequently there is no indication of biliary secretion."

"Though often more or less enlarged, and at other times shrunken, the liver seldom exhibits traces of inflammation, and, if these are discovered, they must be viewed simply as the effect of complications, while the alteration in, or suppression of, the secretory function of the organ, may justly be referred to some cause different from that morbid state."

Dr. Budd throws out the suggestion that the pale colour of the liver in yellow fever may depend upon the presence of fat, without, however, its being present in such quantity as to increase the size of the organ, and cause the striking appearance of the extreme fatty liver of phthisis.

"A few facts," remarks Dr. La Roche, "observed antecedently to the publication of Dr. Budd's work, but evidently unknown to him, and many collected subsequently in this country by pathological inquirers, who at the time had not seen that work, go far to confirm the views of its author, so far, at least, as they relate to the yellow fever."

In the liver of a patient who died of yellow fever in New York, Dr. Alonzo Clark discovered, upon a microscopical examination, "a fatty state of all the secretory epithelial cells, and an abundance of free fat globules," which induced him to query whether the change so constantly observed in the livers of those dying of yellow fever is not an acute fatty degeneration.

"Scarcely," says Dr. La Roche, "a few months had elapsed, when we had in this city the fullest opportunity of confirming the discovery of our very distinguished and accomplished countryman; for, in all the examinations made during the epidemic of 1853, the peculiar change in the liver to which he called attention was detected. These examinations amounted to fourteen at the Pennsylvania Hospital. Several more were made at the St. Joseph's and other hospitals. In the summer of the next year (1854), the livers of those who died with the disease at the first of these establishments—six in number—were in like manner examined under the microscope, and *in every instance, without a single exception*, in both seasons, the results were the same. The number of livers examined was too large, the results obtained were too constantly the same, to allow these to be ascribed to mere coincidence. The changes observed must appertain to the disease, and, as they are not noticed in the livers of individuals who have died of other fevers, they must be placed among the anatomical characters of the yellow fever."

After having examined with care the pathological anatomy of yellow fever, Dr. La Roche enters upon the inquiry as to the connection which exists between the changes discovered after death and the symptoms of the disease, with the view of determining, if possible, any that appertain in a special manner to it, and serve to distinguish it from other febrile diseases. In other words, to discover, if we can, whether dissection reveals any anatomical characters especially belonging to the yellow fever, and imparting to it a distinct nosological position.

In regard to the peculiar discoloration of the liver, and the fatty condition of the organ to which that discoloration is due, Dr. La Roche concludes, that all we can say in the present state of our knowledge is, that they are more frequently noticed in the yellow fever than in other diseases, and approach nearer to what may be regarded as its true anatomical characters, than any morbid change that has been noticed.

While he would be reluctant to regard any of the changes that have been detected in yellow fever, when considered singly, as characterizing the disease, he thinks that we can have no hesitation in admitting that when several of them—a dark mahogany colour of the skin, petechial condition of the gastric-mucous membrane; black matter in the cavity of the stomach and bowels; a yellow discoloration and fatty degeneration of the liver; an albuminous state of the urine, &c.—are found associated together in the same case, there will be no difficulty in forming an opinion as to the nature of the disease.

> "In the yellow fever," he remarks, "more perhaps than in any other disease, it is difficult, if not impossible, to connect as cause and effect the symptoms observed during life with evidences of textural changes discovered after death. That the morbid conditions of the parts, giving rise to the changes in question, must and do manifest themselves during the progress of the disease, by external and recognizable signs, is not to be denied; but it is not the less true that the main and characteristic symptoms cannot always be attributed to any particular discoverable pathological changes in the organs in which they are seated; that they may exist, whether or not those changes are discovered after death, while it may even happen that these are found when the symptoms thought to be due to them had been either absent or of trifling import."

The chapter which follows on the subject of critical days and critical efforts in yellow fever, comprises a very fair digest of all the facts which bear upon the subject. The question in regard to the type of yellow fever comes next under discussion.

With all the best and most authoritative writers on yellow fever, Dr. La Roche describes the disease as one of a single regular paroxysm, of about seventy-two hours duration, more or less, succeeded by a period of calm, or complete cessation of fever. Nothing bearing any analogy to a similar paroxysm recurs after the cessation of the period of calm in question.

> "This remission, or rather sudden cessation of fever after one long paroxysm, the only one which occurs, may be regarded," says Dr. La Roche, "in the light of a well-ascertained fact. It is very seldom, if ever, succeeded by symptoms of vascular reaction, but by an apyretic condition, during which, in severe and aggravated cases, the more malignant phenomena present themselves. It constitutes a marked and distinctive characteristic of yellow fever, and is pointed out as such by every writer, and in every clime. As already stated, it seldom fails to present itself; the exceptions to the rule are rare, and occur in mild cases in which the symptoms of the first stage alone, more or less prolonged, are noticed, or in the violent and congestive forms of the disease, when those of the last stage are not preceded by a period of reaction; while, on the other hand, it is never observed in other forms of febrile complaints—the oriental plague, perhaps, excepted. So true, indeed, is this, that the occurrence in question is of itself almost sufficient to enable us to diagnose the case, while its absence may, unless under the circumstances mentioned, justify a doubt as to the genuineness of the disease, or lead us either to view it as the offspring of a different poison, or to suspect the existence of a complication."

From all the observations recorded in relation to the yellow fever of this and other regions, Dr. La Roche concludes that, in many of the milder cases, particularly when the febrile stage extends beyond the usual time, the disease presents sometimes a slight paroxysmal type, and is subjected to diurnal exacerbations and ameliorations; but that, as a general rule, in well-marked, pure, and malignant cases, the type during that stage is continued, and remissions, if they present themselves at all, are obscure, imperfect, and irregular, consisting, in fact, more in diurnal diminutions of the symptoms, or abatements in the morbid feelings, than in remissions, in the true medical acceptation of the term. Such has been, Dr. La Roche remarks, the case in all the instances of uncomplicated yellow fever which have fallen under his observation.

A most important chapter is given on the complications of yellow fever. The facts and reasoning adduced by the author in reference to this subject are of deep interest. The various modifications which the disease may experience from the influence of morbid agencies independent of those to which it owes its existence, require to be well understood and kept constantly in mind. By not paying due attention to these modifications, the result of causes that may operate on the system in conjunction with, or antecedently to, that by which the yellow fever is produced, errors of diagnosis are very liable to occur. From this cause much confusion in the history of the disease has resulted, while it has led to more than one serious error in regard to its true pathological character and type.

We cannot follow the author in his consideration of the duration of the disease, its convalescence, and the question as to the occurrence of relapses.

The chapter on prognosis is full, and, so far as the subject will admit, clear and explicit. The various circumstances to be taken into consideration, in our attempt to form a probable judgment as to the favourable or unfavourable termination of the disease, are examined in detail, and their relative value carefully examined.

We pass over the chapter on the mortality of yellow fever, which admits of no satisfactory analysis. The subject is one of deep importance, and is treated by the author with the same ability which he has devoted to the consideration of every other question connected with the disease. He has collected with his usual industry all the available facts and statistics calculated to lead to definite results. From all the data he has been enabled to collect, approximate results, however, can alone be derived in relation to the comparitive malignancy of the disease, and the destruction of life produced by it, at the several periods of its prevalence, and at the different points at which it has prevailed in this country, as well as in respect to the difference in this point of view between the disease as it has shown, and continues to show itself in the United States and in foreign lands.

In regard to the true pathology of yellow fever, after passing in review the several theories that have been advanced in elucidation of this important and confessedly intricate subject, and adducing the reasons which induce him to reject these theories, as inconsistent with the known facts in relation to the character, phenomena, and usual course of the disease, Dr. La Roche, from a consideration of the entire phenomena of yellow fever, of the nature and mode of introduction of the agent to which it owes its origin, of the condition of both solids and fluids, and the result of post-mortem examinations, arrives at the following conclusion:—

> "The cause of this complaint, however it may have originated, is *a special poison*, which having penetrated the system and entered the bloodvessels in a manner well known, is carried everywhere through the instrumentality of the blood. It produces in that fluid changes, to which attention was called in a former chapter, and others of a more intimate kind, which escape the cognizance of our senses; and by means of the polluted blood, occasions important morbid changes in some of the abdominal organs. It produces, besides, a morbid impression on the nervous centres, and these, as well as the former, in their turn, induce, by virtue of the numerous sympathies which bind together the various components of the system, diseased modifications in various organs and tissues, and thereby give rise to phenomena of a more or less peculiar kind, or essential to the manifestation of the fever, and varying somewhat in number and violence in different individuals and under different circumstances. The morbid actions thus produced may be combined with opposite conditions of the vital forces, and may or may not be accompanied with inflammation of the parts primarily or secondarily affected; these and the other differences alluded to depending on age, habits of body, and numerous other circumstances connected with the individual; on the degree of combination and violence of the efficient cause; on the peculiar character of the epidemic constitution of the atmosphere; on the nature of the localities, and numerous other modifying agencies. Hence, in some cases—under some circumstances, in the majority, if not all—the morbific action of the poison is such as to destroy

at once the powers of life, or, in less rapidly fatal instances, to greatly diminish them in all the parts to which it penetrates, and by that means, as well as by the diminution of fibrin or other changes occasioned in the blood, to impede or annul the force of reaction inherent in the system, impairing or destroying the vitality of the tissues and organs, checking the secretions, modifying and vitiating the power of nutrition, lowering the tonic force and vital energy of the bloodvessels, promoting the formation of capillary and venous congestions, facilitating the escape of blood from or in the substance of the tissues, &c.

"The disease, in such cases, presents itself clothed in the garb appertaining to the asthenic and congestive forms described in a former chapter, in which there is, strictly speaking, no fever, but in which the identity of the complaint is made out by peculiar symptoms which present themselves from the onset to the close of the attack. In other instances, which in certain seasons and places constitute the majority, the impression of the poison is soon followed by reaction, which becomes more or less marked—continues for a longer or shorter time with the usual symptoms of such a pathological condition—vascular excitement and often florid blood—and is succeeded either by recovery, or, after from two to four days, by a state of collapse and disorganization akin to that which in the other forms occurred from the outset.

"The yellow fever, in such cases, assumes the inflammatory character, and, like the asthenic or congestive form, is susceptible of being classed into several varieties. In many instances, especially of the inflammatory, though sometimes of the asthenic form, the disease shows itself in combination with local inflammation of various organs—particularly of the gastro-intestinal mucous tissue. In other instances, on some occasions in the larger number, those local inflammations are replaced by a greater or less degree of congestion of the capillaries, of the above and other tissues, and of the larger vessels. In others, again, both conditions are combined, and in all severe and fatal cases, the capillaries, at an advanced period, lose their tone, and become the seat of passive hemorrhages. In a word, the modifying agencies to which I have alluded, may so interfere with the action of the poison as to give to the fever it produces, a character altogether different from that which it usually presents, just as a peculiar habit or a peculiar idiosyncrasy will sometimes enable the individual to resist the reception, or at least to throw off or eliminate the poison when received, and escape its deleterious action altogether."

The *diagnosis* of yellow fever, the circumstances which distinguish it from the plague, the cholera, the causus or inflammatory endemic, the scurvy, the typhoid fever, the sweating miliary fever, the relapsing fever, and the bilious remittent fever, constitute the subject of the two concluding chapters of the first volume of the treatise. The circumstances which distinguish the yellow fever from the several diseases enumerated, are considered at great length, and the fact of the peculiar or specific character of the former very clearly demonstrated.

The second volume commences with an investigation of the etiology of the yellow fever. The morbific influences productive of the disease are considered under four general heads: 1. Causes depending on the individual; 2. Hygienic causes; 3. Contagion; 4. Infection.

The first subject discussed is that of acclimatization. The fact that the natives of, or those long resident in those countries of which yellow fever is a prominent endemic, enjoy a remarkable, almost certain, exemption from an attack of the disease, is very fully established.

This acclimatization, so far as relates to the fever in question, consists, according to Dr. La Roche, in great measure, in the change produced in the system by long continuance of high atmospheric temperature, aided by peculiar hygrometrical and other meteorological conditions—barometrical pressure, electrical currents, &c., and, in no small measure, by the permanent or frequently renewed impression of malarial impurities floating in the air, and constituting the usual sources of febrile infection. In tropical regions, where the temperature varies but little in the different seasons of the year, and in such of our southern cities where the winters are mild and of short duration, and followed by long and hot summers, this permanence exists to the degree required. Hence, individuals accustomed by time or otherwise to the climatic conditions they there meet with, become secure against the disease. But in Philadelphia and in temperate regions generally, the same permanence does not obtain. While the summer climate of this and of neighbouring cities may be assimilated to that of tropical regions, and the heat thus experienced, and the morbific conditions of atmosphere created during the summer and autumnal months are amply sufficient to produce the yellow fever; yet this torrid temperature is of comparatively short duration, and is succeeded by long and severe winters, and by a new train of meteorological phenomena, well calculated to destroy the telluric or other causes of the disease when they have existed, to revolutionize or renovate the system, and to prevent the establishment of those organic modifications which require time for their development, but which, when effected, render the individual who undergoes them insusceptible to an attack.

"To this must be added, that the efficient causes of the fever, whatever they may be, are not of annual occurrence, and the system cannot become accustomed to their agency. Natives and residents of temperate regions then find themselves, during such visitation of the disease, in the same position as the creolized or acclimatized inhabitants of warm regions, who lose the protection they enjoyed by a long absence in a colder and more salubrious climate. The low temperature and healthier atmosphere of a long winter destroy or prevent any change that might have been induced by the high thermometrical range of preceding seasons; and on the reappearance of the disease, individuals so situated are as prone to an attack as if they had never been exposed to its causes."

"As to the time required to obtain protection through the process of acclimatization," Dr. La Roche remarks, that "no positive information has yet been obtained. We have seen that, in the French West Indies, a residence of four years is regarded as sufficient to secure the troops from the fever. According to Dr. Doughty, however, a residence of that duration does not secure the British soldiers at the season when, and in situations where, it most prevails, if, previous thereto, the constitution had not been exposed to the operation of the cause; in other words, the individual must, in order to be well secured, have become acclimatized to the place infected. Dr. Barton is of opinion that there is no period of residence, in New Orleans, that will *certainly* exempt one from the fever, and adds, in confirmation of this, that the cemetery records show the fact that people die of it after having been in that city five, ten, or more years. We have seen that in Mobile, a residence of fifteen or twenty years has not been sufficient to protect individuals against the fatal impression of the cause. But these, as well as the occurrence of the disease among resident natives, are exceptions to a rule, and I feel disposed to believe, from all the information I have been able to collect on the subject, that, in the West Indies and our southern yellow fever cities, while such exceptions are sometimes seen in ordinary sickly seasons, and comparatively often in periods of violent epidemics, immunity from residence, with or without the fever, is equal to that afforded by congenital or native creolism, that it is usually acquired in less than ten years—often in five—not unfrequently sooner, and that it is much more perfect when the individual has resided in the place during the prevalence of an epidemic, especially when the latter has been of a severe and malignant character, than when he has done so during a succession of healthy seasons."

In regard to the liability of one who has sustained an attack of the yellow fever, to a second occurrence of the disease, Dr. La Roche remarks that when he calls to mind the facts that have fallen within the sphere of his personal observation, and weighs the testimony adduced in support of both sides of the question, in the West Indies and Europe, as well as in the southern section of our country, it is impossible, he thinks, to withhold the conclusion that it would be little short of absurdity to deny that, as a general rule, an attack of the yellow fever exhausts the susceptibility of the system to further attacks, or renders it less liable to be severely affected by the poison of the disease. Instances of an exceptional kind, he admits, are encountered: although, therefore, the immunity in question may not be as absolute as some of its advocates fancy it to be, he nevertheless considers the conclusion inevitable, that second attacks, in individuals who have passed through the disease, are somewhat rare, and that the immunity obtained by that means is much more secure than that derived from simple acclimatization. Second attacks constitute, therefore, exceptions to a rule, and are perhaps but little more frequently met with than repetitions of other complaints, through which the system usually passes but once. Like attacks of the fever in persons acclimatized by long residence, they occur more especially in times of severe visitations, when the epidemic influence is powerful and wide spread.

Dr. La Roche points out the fact that the persons most prone to the disease are those of a sanguine temperament—the robust, strong, and plethoric, and whose mode of living is one calculated to keep up that temperament. That females, as a general rule, are less obnoxious to the impression of the poison productive of yellow fever than individuals of the other sex; and when attacked have the disease in a milder form. That the disease affects in preference individuals of adult age—sparing, to a greater or less extent, young children, as well as persons advanced in life; that experience everywhere teaches that the disease, without completely sparing, particularly under peculiar circumstances, the individuals of African birth or origin, whether in its sporadic or epidemic forms, affects more generally and severely the white race.

The remarks of the author on the influence of the passions and emotions; the state of sleep; intemperance in respect both to food and drinks; a sudden change from a generous to an abstemious diet; immoderate evacuations; fatigue; and venereal excesses, as predisposing and exciting causes of the disease, are pertinent and instructive; equally so is his examination of the influence of trades, occupations, and conditions of life in relation to their predisposing or exciting tendency, on the one hand, or their apparent tendency on the other, to place the system in a condition best fitted to resist the action of the efficient cause of yellow fever.

The fact of exposure to cold or wet, especially when the body is heated or perspiring through the effect of exercise or other cause, as also exposure to the coolness and chilliness of night, constituting a frequent exciting cause of the disease, is very properly enforced.

Having disposed of those causes which have reference to the particular disposition or condition, natural or acquired, of persons exposed to the disease, Dr. La Roche passes to the consideration of the *circumfusa*, including the various conditions of the atmosphere, such as temperature, the electric and hygrometric states, and the nature of the aerial currents. The influence of each of these in the production of yellow fever is separately and very fully considered.

All the facts in relation to the localities of which the yellow fever is endemic, the seasons at which it prevails, and the conditions under which alone the disease occurs in temperate regions, show the necessity of a tropical temperature of some continuance for its development. Heat must, therefore, be regarded as playing an important part in the production of the yellow fever, whether we view it as a necessary, exciting, or predisposing cause, or as aiding in the development of agencies of a more efficient nature. That the disease cannot be ascribed, however, to the action of a high degree of atmospheric temperature alone, is inferred from the following facts and considerations:—

> "A. In some countries as hot as, and hotter than, those subject to the yellow fever—where the average tropical heat is of longer duration—the disease has never been known to occur; while in others it has only done so occasionally and to a limited extent."
>
> "B. The prolonged action of heat on the system is not necessary for the production of the disease, which often breaks out when the individual has been exposed but a few weeks, a few days, or even only a few hours to the atmosphere of an infected spot."
>
> "C. In countries subject to the yellow fever—where it prevails endemically, or at long intervals—seasons occur in which, though the temperature is as high as, or higher than, during sickly periods, the disease either does not show itself at all, or does so to a limited extent or in a mitigated form."
>
> "In countries subject to the yellow fever, whether endemically, or epidemically at distant intervals, some localities are more or less severely visited; while neighbouring cities, or districts and situations, even at no considerable distance, where the temperature is equally high, are exempted—these at times becoming affected while the others remain healthy."
>
> "In all our pestilences, the disease, as remarked—and the same holds good in most, if not all places—is circumscribed in its sphere of action. Some street, some portion of the city is infected—such sickly parts varying in different visitations—while the rest, where the temperature is equally high, remains free from the disease."
>
> "Were the localities thus infected hotter than others that remain healthy, the circumstance could not be adduced in proof of heat being the efficient cause of the disease, for individuals who are unaffected so long as they remain aloof from the sickly spot, and take it by visiting the latter, are not so from the greater heat they encounter, inasmuch as the risk of infection is not as great in the hottest as in the coolest part of the twenty-four hours.
>
> "Were the heat the principal or efficient cause of the disease, we ought to find the prevalence and severity of the latter, during a sickly season, to be proportioned to the elevation of the temperature. So far from this being the case, it is a well-known fact, that when our cities are visited epidemically with the yellow fever, the disease is not always more particularly rife during the hottest month of the season; but some time after, when the average temperature has lowered in a notable degree; and that so far from its diminishing as the weather becomes cooler, cases are often multiplied daily till the temperature reaches the freezing point, when the occurrence of new cases ceases at once."
>
> "Long continued and excessive heat has occasionally put a stop to the epidemical extension of febrile diseases; at any rate, they cease long before the cessation of hot weather—when, indeed, the temperature has reached its highest point."

The leading positions thus stated are enforced by a strong array of facts. The conclusions at which Dr. La Roche arrives, from a careful review of these, is, that—for the production of yellow fever—

> "Heat may be, and is, to a certain extent, requisite to promote the formation of other agencies; it is doubtless essential to further the evolution of the poison which gives rise to the disease, as everything connected with the appearance of the latter proves—its production in hot weather—its absence in cold, and its appearance on the accession of frost. Heat may act, besides, as an exciting cause; but alone, it cannot occasion the peculiar form of fever under consideration. It requires materials to act upon, and from which, aided by

other influences, it may extract an efficient cause. That high and long continued heat may, and does often, by its action on individuals unaccustomed to its effects, produce fever, is doubtless true, and perfectly well known to all physicians acquainted with the complaints of hot climates; but the disease thus produced is different from true malarial fevers, and especially from genuine yellow fever. More frequently it gives rise to other groups of morbid phenomena more or less distressing, violent and dangerous—cerebral inflammations, or congestions, visceral inflammations, inflammatory angiotenic fevers; but these phenomena, I repeat, are no ways analogous to those characterizing the regular and specific pyrexia under consideration."

In regard to the influence of the intense light of tropical climates and that of our summer months as a predisposing or exciting cause of yellow fever, our author believes it to be very slight; though it is probable it may contribute to place those exposed to its influence, especially the unacclimatized, in a condition favourable to receive the impression of the efficient cause, or it may hasten or excite an attack.

Electricity, Dr. La Roche admits, may, and no doubt does, act as an exciting cause of yellow fever by its excess, and as a predisposing one, sometimes by this excess, and more frequently by its deficiency and modifications. It is possible, also, he believes, that by a derangement of the electric force, or its deficiency, and by the absorbing effects of certain winds which often prevail in epidemic times, the formation and diffusion of the remote cause of the disease may be promoted. He holds, however, that the idea of looking to electricity for the remote or efficient cause of the yellow fever is not tenable. The sphere of prevalence of the disease is often circumscribed within such narrow and well-defined boundaries, that it is difficult to perceive the propriety of regarding it as due to any modification in an agent of that general and wide-spread character necessarily possessed by the one under consideration.

Dr. La Roche admits the morbific influence of an undue increase or diminution of atmospherical pressure, as well as of those violent commotions of the barometer which sometimes occur. But he believes that these changes in the weight and density of the atmosphere can do no more than place the system in such a condition as will predispose it to the deleterious impression of some more efficient cause, especially when we find that the same condition of the barometer exists as well when the yellow fever does not, as when it does prevail.

The subject of atmospherical humidity as a cause of yellow fever is discussed at great length by our author. The facts adduced by him afford, he thinks, a convincing proof that the disease is produced under opposite hygrometrical conditions of atmosphere; and that those who ascribe its origin and prevalence to excess of atmospheric and terrestrial humidity in all places, and under all circumstances, err as greatly as those who refer it exclusively to a dry or droughty state of the air.

"Nevertheless," he remarks, "while the fever breaks out and spreads in some localities and seasons during the prevalence of rain and of atmospheric humidity, we may infer from what has been stated, that it does so often under the influence of a different state of weather. The experience of this city would appear to favour this view of the subject. It will be found that the disease usually breaks out in the latter part of summer—that it prevails until arrested by the accession of frost, and that, during the greater part of this period, the weather is ordinarily dry."

When, however, humidity of atmosphere exists in any country, or at any season, the fever may be expected to prevail more certainly and extensively than it would otherwise do.

"We discover," says Dr. La Roche, "in this fact one of the causes of the habitual prevalence of the disease in tropical climates and in portions of our Southern States, where the humidity is great, and the heat, in consequence, oppressive. In the Middle States, and the South of Europe, where the humidity of the atmosphere is much less considerable, and exists in excess only at particular seasons, and where the heat is less frequently and continuously oppressive than in tropical regions, the fever is of rarer occurrence, and requires for its production and epidemic diffusion a combination of circumstances seldom encountered together—as well, perhaps, as a primary cause of greater intensity than that which usually occasions the disease in climates where the predisposing influence in question paves the way to its spread."

While Dr. La Roche rejects the idea that either heat or moisture, when acting separately, can be productive of yellow or kindred fevers, he considers equally objectionable the belief that the disease arises from the combined influence of these two agencies, either unassisted by another cause of a more efficient kind and peculiar character, or with the aid of some agent calculated only to render the system more prone to the impression of the other. Neither can he admit the propriety of referring the efficient cause of yellow and kindred fevers to vicissitudes of temperature—the succession of cool or cold nights to hot days, nor to the sudden exposure of the body, at any period of the twenty-four hours, to a low degree of temperature after it has been placed, for a greater or less extent of time, under the influence of a high degree—however efficient such vicissitudes may be as exciting causes simply.

An examination of the question as to the agency exercised by particular winds in the production of yellow fever, upon which so much has been written, leads our author to the conclusion that, inasmuch as facts show a diversity of result to arise from the same wind, and a sameness of effect from currents of different character, no particular wind can be said, with any show of reason, to constitute, by itself, the necessary and efficient cause of the disease; and that, whenever any of them exercise any agency as regards the origin or diffusion of the fever, it derives that power not from the fact of its coming from any particular quarter, but from the temperature and hygrometrical conditions of the moving column of air, and more especially, perhaps, from the injurious effluvia it raises from the localities and surfaces over which it passes, and which are carried along with it.

"The fact," remarks Dr. La Roche, "is proverbial, that the yellow fever usually breaks out and is most rife in places noted for want of due ventilation—narrow, close streets and alleys. Here, whether in hot climates or in our latitudes, during the tropical heats of summer, the air becomes close, oppressive, and hot to a degree beyond what might be expected from the height of the mercury in the thermometer. This condition of atmosphere occasions in many a wakefulness, and in others of particular constitutions, a variety of disagreeable nervous sensations; and from this it may be readily conceived to render the system impressionable to the action of the efficient cause of the fever, while, at the same time, it tends greatly to promote the evolution of the latter, and concentrate and aggravate its effects." But, however frequent may be the stagnation of air in question, and however injurious its effects, it cannot, Dr. La Roche remarks, be held as essential to the production of the disease, seeing that the latter often breaks out and prevails extensively under circumstances of an opposite character, and where the ventilation is no less free and perfect than in healthy seasons, while, at other times, this stagnation, attended with its usual effects on the system, presents itself frequently during seasons noted for their salubrious character, and unmarked by a single case of fever.

Previously to entering upon a consideration of the nature and source of the immediate and efficient cause of the yellow fever, the question of the contagious or non-contagious character of the disease is very fully and thoroughly discussed. In which question, as Dr. La Roche very truly remarks, that of the origin and propagation of the fever, here and elsewhere, resolves itself.

> "For if the latter is imported, *per se*, through the instrumentality of individuals labouring under, or convalescing from it, it must be endowed with contagious properties. If it be so endowed, it is not likely to arise from domestic causes, diseases of this kind being seldom if ever contagious, and must, therefore, be ascribed to importation from places where it more usually prevails. In that case, all epidemic scourges, and even sporadic cases, may naturally be referred to a foreign source; and we can find no difficulty in ascribing the diffusion of the fever, when so introduced, to the communication of the well with the sick, or with substances impregnated with the poison. If, on the other hand, the fever is not endowed with the power of transmissibility alluded to, it can scarcely be presumed to have been imported in the way contended for by the contagionists. It must hence be referred to the operation of domestic causes, unless it can be shown that this, or any other fever, can either lose or acquire that power by a change of locality and the agency of external circumstances, and its propagation must be admitted to take place independently of any influence on the part of the sick."

To this most important point in the etiology of yellow fever, Dr. La Roche has given all the attention that its importance demands. Every fact and consideration calculated to throw light upon it is carefully scrutinized, and its true bearing and value in the settlement of the question cautiously and candidly tested. No argument of any weight adduced on either side is passed unnoticed. The chapters devoted to its discussion occupy nearly four hundred pages of the second volume of the treatise. The facts and arguments that have been advanced in proof of the contagious character of the yellow fever are first presented at full length. Giving to these all the weight they deserve, Dr. La Roche nevertheless rejects, *in toto*, the doctrine of the contagiousness of the disease; his arguments in favour of such rejection are arranged under the following heads. To present anything like a satisfactory enumeration of the facts and reasoning of the author in reference to each of these would extend the present notice to a most unreasonable length. All we can do is to enumerate his series of arguments, referring to the work itself for their elucidation.

The proofs of the non-contagiousness of yellow fever adduced by Dr. La Roche, are: 1. The appearance of the disease at determinate periods of the year. 2. The occurrence of the fever under the influence of certain meteorological states, and usually associated with the prevalence and increased prevalence of malarial fevers, which is not the case with contagious diseases. 3. When the yellow fever is epidemic, it often absorbs or supersedes other diseases, which contagious diseases do not. 4. It is a disease of hot climates and hot weather only, and is arrested by cold. 5. It is influenced in its prevalence and severity by atmospheric vicissitudes. 6. The malignancy of the disease is increased by continuance of residence in the infected localities. 7. The epidemic influence productive of the disease is felt by those who avoid exposure to the sick. 8. Its outbreak is often preceded, accompanied, or succeeded by certain phenomena in the vegetable or animal kingdom. 9. The system becomes inured to the effect of the efficient cause of the disease. 10. Yellow fever is local in its habitation—the area of the sickly locality being sometimes very circumscribed—and, beyond this infected locality, the disease is not communicated. 11. The fever is not communicated in the purer air of the country. 12. Removal of the population from infected districts puts a stop to the further increase of the disease—excepting in the cases of persons visiting such districts, after all the sick have been removed, who are liable to be attacked. 13. The fever is more prevalent, and of worse character in some parts than in others of an infected place. 14. It originates in low, and in or near impure localities. 15. The agency of upturning of earth, and the influence of made ground in the production of yellow fever. 16. The connection of inundations, and of extensive fires, with its occurrence. 17. Yellow fever does not always occur in seaports. 18. Its local origin is proved by its occurrence on board of ships. 19. The beneficial effects of expurgation is, also, a proof of the local origin of the disease. 20. It is not communicated to neighbouring towns, cities, or plantations. 21. It is not communicated in hospitals, barracks, &c. 22. It is not conveyed by individuals or otherwise to ships in the vicinity of infected localities. 23. It is not communicated by fomites. 24. It is not communicated by handling the sick or the dead, and by dissections of the latter. 25. Seclusion affords no safety from attacks of the disease. 26. Quarantine is ineffectual in preventing the outbreak of the disease in sickly places and seasons. 27. Altitudinal and geographical ranges are different in yellow fever and contagious diseases. 28. The effects of night air as an exciting cause of the fever. 29. The desultory course of the disease. 30. The proteiform character of the disease. 31. The classes, races, sexes, and ages affected by it.

In the course of the foregoing discussion, Dr. La Roche shows that the fact of the yellow fever not appearing annually is no proof of its contagious character; that its prevalence in tropical regions coinciding with its occurrence in this country is no proof of contagion and importation; that exemption of other parts from the disease when it prevails in some places, is no proof of its exotic origin and contagious character; that the local origin of the disease is proved by the occurrence of sporadic cases; and that exemption from a second attack of yellow fever is no proof of its contagious character.

The hypothesis of a contingent contagion in yellow fever—that, on the one hand, the disease requires for the manifestation of its contagious properties the influence of an impure atmosphere, or, on the other, that a contagious property not necessarily appertaining to the disease, is generated by foul air, is very thoroughly examined, and, as it appears to us, entirely refuted.

Another doctrine in reference to the transmissibility of yellow fever is that the poison of yellow fever—which some regard as a miasm produced by materials having no connection with the living body—and others as a contagious virus evolved from the sick—is carried from place to place, in ships, merchandise, clothes, about the persons of travellers, &c., and, as the contagionists aver, in the system of the sick; and, when so imported, is multiplied and extended epidemically by assimilating to its own nature something it meets with there. In other words, the peculiar poisonous effluvium, which, if imported into a perfectly clean locality, would occasion no evil effect, acts very differently when brought during hot weather into a place replete with materials from which issue morbid exhalations; for it then plays on those materials the part of a ferment, and through their agency is enabled to reproduce itself, or out of them to give origin to a substance of the same nature, and endowed with identical properties, as yeast is generated during the vinous fermentation which yeast has set in motion.

Dr. La Roche shows that this hypothesis is unsustained by a single well accredited fact or plausible analogy—that the property in question is not an attribute of any known variety of non-contagious febrile poisons.

Dr. La Roche refers the production of yellow fever to infection, or that morbific agent or poison which results from the decomposition of dead animal and vegetable substances, or other putrescent materials, if such exist, and through means of which a morbid state is induced in the system of individuals exposed to its action; and hence places the disease in the same category with endemic remittent and intermittent fevers. This doctrine of infection, as applied to yellow fever, is confirmed, he believes, by all the facts recorded in the work before us.

> "But, while entertaining these views respecting the origin of the yellow fever from local sources of infection, he does not wish to be understood as meaning that the poison producing the disease is precisely similar to that giving rise to ordinary remittent and intermittent fevers, and that it differs from it only in regard to degree of intensity. In a preceding chapter, reasons were assigned in support of the opinion that the yellow fever, though belonging to the same class or family of diseases as the other febrile complaints mentioned, nevertheless differs from them to a sufficient degree in regard to phenomena as to justify us in regarding it as constituting a separate and distinct complaint. If such be the case, the effluvia giving rise to it may reasonably be viewed as constituted of different elements produced by the decomposition of different materials—or, perhaps, of different proportions of the same elements proceeding from the decomposition of similar materials, but under the influence of peculiar external agencies."
>
> "Be this, however, as it may, certain it is, that the yellow fever, though of miasmal origin, is not the offspring of the effluvia of ordinary marshes, or issuing from the margin of streams, ponds, lakes, open flat countries or savannas, or of swampy or humid soil generally, to some or all of which, remittents and intermittents are usually traced. For, in many places where such localities abound, yellow fever is unknown; while, on the contrary, the latter prevails where such characters of localities are absent. In a word, it will be found that the several forms of fever do not necessarily manifest themselves in the same situations. Thus, in this country, while the yellow fever is a disease of cities and towns—generally of only a portion of these—common remittents, and especially intermittents, spread on the skirts of these, and more particularly in the open country, and seldom, if ever, penetrate, to any extent at least, within thickly built and populous habitations; and when they do so, we very generally discover that they spare those peculiar locations where the yellow fever is rife. This is true, whether we turn to the southern, southwestern, or middle sections of the country."

The same general fact, also, obtains in every country where the yellow fever prevails as an endemic, or as an epidemic at long intervals.

> "The malarial effluvia giving rise to the yellow fever may be inferred to differ from those occasioning remittent and intermittent fevers, not only from the difference existing in the phenomena of those diseases, and the character of the localities they visit, but from the fact that they are apparently governed, on many points, by different laws. It is admitted by Dr. Chervin, a strong and uncompromising advocate of the unity of all miasmal fevers, that although the effluvia occasioning the yellow fever are, like those giving rise to remittents and intermittents, wafted by the wind, still, as regards the former, the deleterious effects they produce do not extend as far as is the case with the latter. But it may be doubted whether the extension is even as great as this gifted writer was disposed to believe; for while the malaria of common remittent and intermittent fevers is wafted to a considerable distance—even several miles—over land, and has been asserted by some, though denied by others, as regards some localities at least, to extend to a greater distance over the surface of water, facts show that the poison of the yellow fever extends but little beyond the sources of its origin—attacking one or a few streets, or one side of a street, ship, &c.—and not unfrequently progresses in a contrary direction to the wind. Again, while the miasm of remittents and intermittents ascends to a considerable height—some-

times 1,000 feet—and exhibits a tendency to that effect, the poison of the yellow fever creeps along the surface of the ground, selecting the lower stories of houses and hospitals, and leaving the upper uncontaminated, and does not manifest a tendency to be wafted to any great elevation above the surface of the place where it is evolved."

"Whatever be the nature of the morbific agent producing the yellow fever, or the materials from which it is derived, and however effective this agent may be, when the requisite meteorological conditions are present to generate the disease, certain it is," remarks Dr. La Roche, "that its existence cannot alone suffice to account for the epidemic diffusion exhibited by the latter at certain periods. Every one who has investigated the subject of the history of the yellow fever—and the same remark applies equally well to other diseases which take on the epidemic garb, whether contagious or otherwise—knows that, while in some seasons the number of cases is limited, the disease prevailing within very circumscribed boundaries, making slow, if any, progress, and assuming either a sporadic character, or one scarcely deserving the name of epidemic, in other seasons, marked by meteorological conditions and peculiarities of locality differing but little, if at all, from those exhibited in the former instances, the fever, originating from seemingly small beginnings, in one or few spots of circumscribed extent, soon spreads far and wide, rages fiercely and fatally, covers in a short time an enlarged surface of ground, and there attacks a large number of individuals—in a word, assumes the charater of a wide-spreading pestilence. The history of the disease shows, as has been pointed out in various parts of the present work, that, in most of the cities of this country, epidemics of the disease have appeared, at intervals of greater or less extent—breaking out violently and spreading widely in some seasons, and sparing the same places for several, and even many, successive seasons, the meteorological phenomena and sources of infection remaining the same."

The particular influencing agency which thus facilitates the diffusion or increases the severity of a local cause or contagious virus, either by promoting its generation and aggravating its virulence, or by increasing the susceptibility of individuals exposed to its morbid impression, and which, besides, modifies the character of the prevailing disease, is invisible and widely spread, and, owing to its depending apparently upon some peculiar alteration of the surrounding air, has received the name of epidemic constitution of the atmosphere. In what it consists, and to what it is due, are points which, so far, have not been positively ascertained. Its existence can only be inferred from effects that can be accounted for in no other way.

The foregoing is a simple announcement of the views of Dr. La Roche, in relation to the efficient cause of yellow fever. To follow the author in his exposition and defence of them, and in his examination of the nature of the materials giving rise to the peculiar poison productive of the disease, whether it be the product of vegetable or animal decomposition, or of both, would extend our notice of the work before us—already, perhaps, of unreasonable length—to the exclusion of a due notice of others that claim our attention. For the same reason, we must forego even a passing comment upon the treatment of yellow fever, so ably and satisfactorily discussed in the following chapters, as well as upon the interesting chapter with which the second volume closes, devoted to the prophylaxis of the yellow fever—a chapter that might be studied with profit by all such as are intrusted by law with the sanitary police of our cities.

In an appendix an analysis is given of the facts connected with the rise and progress of some of the more prominent among the innumerable epidemics that have been adduced here and elsewhere in illustration of the foreign origin, and of the power of transmissibility of the disease through various channels.

We have endeavoured to present to our readers some idea of the general arrangement of the treatise of Dr. La Roche, and of the manner in which he has treated the more prominent of the questions involved in the history, etiology, and pathology of the yellow fever. In so doing, we have attempted nothing beyond an analysis, interspersed with frequent quotations. We have found no occasion for criticism, none for an expression of dissent from the views advanced by the author. His facts are all accurately and fairly stated, and his deductions bear throughout a legitimate and truthful character. We feel convinced that the work will be favourably received by the entire medical profession. Merely in the light of a complete, faithful, and well-arranged digest of the leading facts in relation to the yellow fever, the work is of great value and interest; while, as a complete scientific treatise on the disease, it is superior to any with which we are acquainted. It is one calculated to confer a tone and character upon American medical literature, and, unless it meets with the favourable reception we anticipate for it, we shall distrust the desire, so constantly professed, for the encouragement of native professional writers. D. F. C.

ART. XII.—*Elements of Medicine: a Compendious View of Pathology and Therapeutics; or the History and Treatment of Diseases.* By SAMUEL HENRY DICKSON, M. D., LL. D., Professor of the Institutes and Practice of Physic in the Medical College of the State of South Carolina. 8vo. pp. 752, 1855. Blanchard and Lea, Philadelphia.

WE shall not inquire whether there existed any actual demand for another systematic treatise on the practice of medicine, or whether those we already had were not sufficient to supply all the wants of the profession. We would rather encourage every effort on the part of American physicians, endowed with the qualifications necessary for the proper accomplishment of the task, to increase our stock. The works of this class with which we have been already furnished by the practitioners of our own country, are unquestionably of a very high character, and in the multiplication of such books, notwithstanding the necessary sameness of much of the matter contained in them all, we can see no evil, but much good. The difference in the manner in which similar truths are presented, illustrated, and enforced by different writers; the greater extent to which certain points are dwelt upon by one than by another, adapt the several treatises to the diverse wants of that large class of professional readers by whom they are constantly consulted, and of whose libraries they constitute the most important volumes.

The author of the treatise before us is already very favourably known to the medical profession by his *Essays on Pathology and Therapeutics*, published in 1845, and his very admirable report on the *Blending and Conversion of Types in Fevers*, made to the American Medical Association in 1852.

Of the volume of essays, the present treatise is simply a new edition with some difference in its arrangement and many additions. Having given to the former work a somewhat extended notice shortly after its appearance (*See No.* XIX. *of this Journal, July*, 1845), it will be unnecessary for us to go over the same ground again. The commendation bestowed upon the essays is alike applicable to the work before us, while the errors and deficiencies we